Scope of claims

1. A flexible transfer installation in which a transfer conveyer is composed such that, a plurality of transfer pieces each comprising a pair of erect flat spacer member connected to both end sides of connection members which constitute a transfer passage of articles including foodstuff are connected to each other to be capable of moving in the direction of transfer relative to each other, and said transfer pieces can be piled in a vertical spiral by allowing an upper side positioned spacer member to rise on a spacer member positioned right under said upper side positioned spacer member; wherein said spacer member is formed to have an inside-part and an outside-part continuing to said inside-part and offsetting from the inside-part outward in lateral direction perpendicular to the transfer direction, an engaging part extending in a lateral direction perpendicular to the transfer direction and having a contact face is formed at the upper end part and lower end part of the outside-part of the spacer member, and the lower engaging part of a spacer member rises on the upper engaging part of a vertically downwardly adjacent spacer member to be supported via the contact face of each engaging part.

2. The flexible transfer installation according to claim 1, wherein the outside end of each of said upper engaging part and lower engaging part of the spacer member is bent to form an inclined part inclined by a certain angle to the vertical direction so that the movement of the transfer piece in lateral directions perpendicular to the transfer direction can be retained.

3. The flexible transfer installation according to claim 1, wherein both end parts of bar-like connection members are fixed to the outside-part of said pair of spacer members, an oblong hole of a certain length along the transfer direction is made in the inside-part of said pair of spacer members, and the transfer conveyer is composed such that both end parts of one of said connection members are passed through the oblong holes of the spacer members to be movable relative to the pair of spacer members so that each transfer piece can move relative to each other in the transfer direction by loose fitting of the connection member in the oblong holes.

4. The flexible transfer installation according to claim 1, wherein both end parts of said bar-like connection members are fixed to the outside-part of said pair of spacer members, both end sides of one or some of the connection members are extended beyond the fixed parts, the extended parts being bent upward to form guide parts to be guided along support members provided on both sides of the transfer conveyer at a plurality of positions along transfer direction, the end of the extended portion is bent in the horizontal direction to be fixed to the upper engaging part of the outside-part of the spacer member to reinforce the spacer member.

5. The flexible transfer installation according to claim 1, wherein chain lines being allowed to move in the horizontal direction driven by a driving source such as a motor is provided, transfer conveyer supporters on which the transfer conveyer is supported are attached to the chains so that the lower ends of the transfer pieces composing the transfer conveyer rise on the supporters, the traveling of the chains is transmitted to the transfer conveyer by the contact of the

lower ends of the transfer pieces with the transfer conveyer supporters and the transfer conveyer can advance together with the chains.

6. A foodstuff transfer system provided with a flexible transfer installation having a transfer conveyer which is composed of a plurality of transfer pieces each comprising a pair of erect flat spacer members connected to both end sides of connection members which constitute a transfer passage of foodstuff are connected to each other to be capable of moving in the direction of transfer relative to each other, wherein said spacer member is formed to have an inside-part and an outside-part continuing to said inside-part and offsetting from the inside-part outward in lateral direction perpendicular to the transfer direction, an engaging part extending in a lateral direction perpendicular to the transfer direction and having a contact face is formed at the upper end part and lower end part of the outside-part of the spacer member, a spiral pile of the transfer conveyer is formed by piling the transfer pieces vertically along a spiral by allowing the lower engaging part of a spacer member to rise on the upper engaging part of a vertically downwardly adjacent spacer to be supported via the contact face of each engaging part, the spirally piled transfer conveyer is accommodated in a heat insulated room, and an endless transfer conveyer is composed by connecting the entrance and way-out of the transfer conveyer to and from the heat insulated room.

7. The foodstuff transfer system according to claim 6, wherein a refrigerating machine is installed in the space formed inside the spiral of the spirally piled transfer conveyer.

8. A flexible transfer installation in which a transfer

conveyer is composed such that, a plurality of transfer pieces each comprising a pair of erect flat spacer member connected to both end sides of connection members which constitute a transfer passage are connected to each other to be capable of moving in the direction of transfer relative to each other, and said transfer pieces can be piled in a vertical spiral by allowing an upper side positioned spacer member to rise on a spacer member positioned right under said upper side positioned spacer member; wherein said spacer member is formed to have an inside-part and an outside-part continuing to said inside-part and offsetting from the inside-part outward in lateral direction perpendicular to the transfer direction, and an engaging part is formed at the upper or lower end part of the inside-part and outer-side part, the engaging parts bending oppositely to each other in lateral direction perpendicular to the transfer direction so that the upper part and lower part of the spacer members adjacent to each other in the vertical direction can contact with each other.

9. The flexible transfer installation according to claim 8, wherein the engaging part of the inside-part and outside-part of the spacer member is respectively formed to have an inclined part inclined by a certain angle to the flat plane of the spacer member so that the movement of the transfer piece in lateral directions perpendicular to the transfer direction can be restrained.

10. The flexible transfer installation according to claim 8, wherein both end parts of said bar-like connection members are fixed to the outside-part of said pair of spacer members, an oblong hole of a certain length along the transfer direction is made in the inside-part of said pair of spacer members,

and both end parts of one of said connection members are passed through the oblong holes to be movable relative to the pair of spacer members so that each transfer piece can move relative to each other in the transfer direction by loose fitting of the connection member in the oblong holes.

11. A foodstuff transfer system provided with a flexible transfer conveyer which is composed of a plurality of transfer pieces each comprising a pair of erect flat spacer members connected to both end sides of connection members which constitute a transfer passage of foodstuff are connected to each other to be capable of moving in the direction of transfer relative to each other, wherein said spacer member is formed to have an inside-part and an outside-part continuing to said inside-part and offsetting from the inside-part outward in lateral direction perpendicular to the transfer direction, an engaging part is formed at the upper or lower end part of the inside-part and outer-side part, the engaging parts bending oppositely to each other in lateral direction perpendicular to the transfer direction so that the upper part and lower part of the spacer members adjacent to each other in the vertical direction can contact with each other, a spiral pile of the transfer conveyer is formed by piling the transfer pieces vertically along a spiral by allowing the lower engaging part of a spacer member to rise on the upper engaging part of a vertically downwardly adjacent spacer to be supported via the contact face of each engaging part, the spirally piled transfer conveyer is accommodated in a heat insulated room, and an endless transfer conveyer is composed by connecting the entrance and way-out of the transfer conveyer to and from the heat insulated room.

12. The foodstuff transfer system according to claim 11, wherein a refrigerating machine is installed in the space formed inside the spiral of the spirally piled transfer conveyer.

13. A flexible transfer installation in which a transfer conveyer is composed such that, a plurality of transfer pieces each comprising a pair of erect flat spacer member connected to both end sides of connection members which constitute a transfer passage of articles including foodstuff are connected to each other to be capable of moving in the direction of transfer relative to each other, and said transfer pieces can be piled in a vertical spiral by allowing an upper side positioned spacer member to rise on a spacer member positioned right under said upper side positioned spacer member; wherein each spacer member has a contact face extending parallel to the transfer direction at the lower end thereof, an inside chain to allow one of the pair of the spacer members riding on the inside chain to move together with the inside chain and an outside chain to allow the other of the pair of the spacer members riding on the outside chain to move together with the outside chain are provided, each of the spacer members contacting the chain with said contact face to ride on the chain, and the inside chain and outside chain are driven by a single motor.

14. The flexible transfer installation according to claim 13, wherein said inside chain and outside chain are looped respectively over an inside sprocket and an outside sprocket driven by said single motor, the chains being composed to be an endless chain respectively to allow the transfer pieces to be advanced to the spiral and then to return to the sprockets,

a speed change gear drive is mounted between the inside sprocket and outside sprocket to reduce the rotation speed of the inside sprocket to be slower than the rotation speed of the outside sprocket, and the axes of rotation shafts to drive the sprockets are disposed horizontally.

15. The flexible transfer installation according to claim 13, wherein said transfer conveyer is guided looping over guide pulleys from the way-out of the spiral pile to the portion where the transfer conveyer rides on the inside chain and outside chain to be advanced to the spiral pile, whereby the pair of spacer members contact the outer periphery of the pulleys.

16. The flexible transfer installation according to claim 14, wherein the ratio of number of teeth of the inside gear connected to the inside sprocket to that of the outside gear connected to the outside sprocket is determined to coincide with the ratio of the curvature radius of the outside chain at the outside sprocket to that of the inside chain at the inside sprocket.

17. The flexible transfer installation according to claim 13, wherein said inside chain and outside chain are composed to be curved chains deformable in lateral direction perpendicular to the direction along the transfer direction of the transfer passage.

18. The flexible transfer installation according to claim 13, wherein are provided tension pulleys each to be looped over by the inside chain and outside chain and tension springs each to pull each tension pulley for tensioning the chains.

19. The flexible transfer installation according to claim 13, wherein the transfer conveyer is accommodated in an

insulated room provided with a refrigerating machine and the motor is installed outside the insulated room.